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## PCT

### NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner  
US Department of Commerce  
United States Patent and Trademark  
Office, PCT  
2011 South Clark Place Room  
CP2/5C24  
Arlington, VA 22202  
ETATS-UNIS D'AMERIQUE  
  
in its capacity as elected Office

Date of mailing: <div style="text-align: center;">18 October 2001 (18.10.01)</div>	
International application No.: <div style="text-align: center;">PCT/AU01/00392</div>	Applicant's or agent's file reference: <div style="text-align: center;">104829</div>
International filing date: <div style="text-align: center;">06 April 2001 (06.04.01)</div>	Priority date: <div style="text-align: center;">06 April 2000 (06.04.00)</div>
Applicant: <div style="text-align: center;">BROWN, Ian, Lewis et al</div>	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International preliminary Examining Authority on:  

14 May 2001 (14.05.01)

☐ in a notice effecting later election filed with the International Bureau on:  

\_\_\_\_\_

2. The election ☒ was

☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

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The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland  Facsimile No.: (41-22) 740.14.35	Authorized officer:  <div style="text-align: center;">J. Zahra</div> Telephone No.: (41-22) 338.83.38
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(19) World Intellectual Property Organization  
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(43) International Publication Date  
18 October 2001 (18.10.2001)

PCT

(10) International Publication Number  
**WO 01/76394 A1**

(51) International Patent Classification<sup>7</sup>: A23L 1/308, 1/30

[AU/AU]; 40 Stanwell Avenue, Stanwell Park, NSW 2058 (AU).

(21) International Application Number: PCT/AU01/00392

(22) International Filing Date: 6 April 2001 (06.04.2001)

(25) Filing Language: English

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(71) Applicant (for all designated States except US): **PENFORD AUSTRALIA LIMITED** [AU/AU]; 170 Epping Road, Lane Cove, NSW 2066 (AU).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **BROWN, Ian, Lewis** [AU/AU]; 18 Valley Way, Gympie, NSW 2227 (AU). **STORLIEN, Leonard, Henry** [AU/SE]; Snohjdsstigen 16, S-431 39 Molndal (SE). **BROWN, Marc, Andrew** [US/US]; 8970 SW Sagert, Tualatin, OR 97062 (US). **HIGGINS, Janine** [AU/US]; 4295 E. Mexico Avenue, Denver, CO 80262 (US). **TAPSELL, Linda, Clare**

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(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

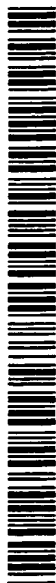
**Published:**

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: STARCH SUB-TYPES AND LIPID METABOLISM

(57) Abstract: A method is provided for regulating carbohydrate and fat metabolism in an individual which method comprises replacing a proportion of the individual's daily carbohydrate intake with resistant starch and a proportion of the individual's saturated fat intake with unsaturated fat. Also provided are compositions comprising resistant starch and unsaturated fats and methods for making and using the same.



**WO 01/76394 A1**

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/AU01/00392

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
Int. Cl. <sup>7</sup> : A23L 1/308, 1/30		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols) SEE "ELECTRONIC DATA BASE" BOX BELOW		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) WPIDS: resistant starch, unsaturated fat, A23L 001/30?		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	ASP, N.G., <i>Advances in Experimental Medicine and Biology</i> , 1997, Vol. 427, pages 201-210	1-38
X	KRIS-ETHERTON, P.M., <i>Journal of Cardiovascular Risk</i> , 2000, Vol. 7, No. 5, pages 333-337	1-38
X	EP 0 506 166 A (UNILEVER N.V., et al.) 30 September 1992 whole specification	1-38
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex		
<p>* Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&amp;" document member of the same patent family</p>		
Date of the actual completion of the international search 18 June 2001		Date of mailing of the international search report 5 July 2001
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No. (02) 6285 3929		Authorized officer  JAMIE TURNER Telephone No : (02) 6283 2071

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU01/00392

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 550 060 A (KANEAGAFUCHI KAGAKU KOGYO KABUSHIKI KAISHA) 7 July 1993 whole specification	1-38
X	EP 0 747 397 A (NATIONAL STARCH AND CHEMCAL INVESTMENT HOLDING CORPORATION) 11 December 1996 whole specification	1-38
X	EP 0 846 704 A (CERESTAR HOLDING B.V.) 10 June 1998 whole specification	1-38
X	WO 97/35889 A (OPTA FOOD INGREDIENTS, INC.) 2 October 1997 whole specification	1-38

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

International application No.  
**PCT/AU01/00392**

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report				Patent Family Member			
EP	506166	CA	2063784	JP	5236908		
EP	550060	JP	6065082	US	5268367		
EP	747397	AU	52271/96	CA	2178128	JP	9012601
		US	5593503	US	5902410		
EP	846704	AU	46846/97	CA	2223149	JP	10191931
		US	6043229				
WO	9735889	AU	24246/97	CA	2249313	EP	889908
		US	5849090				
END OF ANNEX							

**INTERNATIONAL COOPERATION TREATY**  
**PCT**  
**INTERNATIONAL PRELIMINARY EXAMINATION REPORT**  
(PCT Article 36 and Rule 70)

REC'D 07 DEC 2001

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Applicant's or agent's file reference 104829/NJF	<b>FOR FURTHER ACTION</b>	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).
International Application No. PCT/AU01/00392	International Filing Date (day/month/year) 6 April 2001	Priority Date (day/month/year) 6 April 2000
International Patent Classification (IPC) or national classification and IPC Int. Cl. <sup>7</sup> A23L 1/30, 1/308		
Applicant PENFORD AUSTRALIA LIMITED et al		

1.	This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2.	This REPORT consists of a total of 4 sheets, including this cover sheet. <input type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).  These annexes consist of a total of sheet(s).
3.	This report contains indications relating to the following items:  I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application

Date of submission of the demand 14 May 2001	Date of completion of the report 29 November 2001
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer  <b>JAMIE TURNER</b> Telephone No. (02) 6283 2071

**I. Basis of the report**

## 1. With regard to the elements of the international application:\*

☒ the international application as originally filed.☐ the description,        pages , as originally filed,  
   pages , filed with the demand,  
   pages , received on    with the letter of☐ the claims,        pages , as originally filed,  
   pages , as amended (together with any statement) under Article 19,  
   pages , filed with the demand,  
   pages , received on    with the letter of☐ the drawings,        pages , as originally filed,  
   pages , filed with the demand,  
   pages , received on    with the letter of☐ the sequence listing part of the description:  
   pages , as originally filed  
   pages , filed with the demand  
   pages , received on    with the letter of

## 2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).☐ the language of publication of the international application (under Rule 48.3(b)).☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

## 3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.☐ filed together with the international application in computer readable form.☐ furnished subsequently to this Authority in written form.☐ furnished subsequently to this Authority in computer readable form.☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished4. ☐ The amendments have resulted in the cancellation of:☐ the description,        pages☐ the claims,        Nos.☐ the drawings,        sheets/fig.5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\*

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

\*\* Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report



**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Claims 1-38	YES
	Claims	NO
Inventive step (IS)	Claims	YES
	Claims 1-38	NO
Industrial applicability (IA)	Claims 1-38	YES
	Claims	NO

**2. Citations and explanations (Rule 70.7)**

Reference is made to the following documents which were first raised in the corresponding International Search Report:

D1 - Advances in Experimental Medicine and Biology, 1997, vol. 427, pages 201-210

D2 - Journal of Cardiovascular Risk, 2000, vol. 7, no. 5, pages 333-337

D3 - EP 0 506 166

D4 - EP 0 550 060

D5 - EP 0 747 397

D6 - EP 0 846 704

D7 - WO 97/35889

**NOVELTY:**

No individual citation teaches all of the features of the claimed invention, which is a method of regulating carbohydrate and fat metabolism in an individual comprising replacing at least 5% of the individual's daily carbohydrate intake with resistant starch and at least 10% of the individual's saturated fat intake with unsaturated fat (claim 1) and a food composition comprising at least 2g of resistant starch and at least 2g of unsaturated fat wherein the resistant starch makes up at least 5% of the total starch content (claim 13).

**INVENTIVE STEP:**

The invention the subject of the claims of the present application seems to hinge upon two very well known aspects of healthy human nutrition: the use of resistant starch and the use of unsaturated fat in a nutritive diet. A diet containing resistant starch is known (in the common general knowledge - see D1, D3, D4 et al.) to reduce glycemic response (and hence the incidence of diabetes), to reduce serum cholesterol and triglyceride levels (and hence the incidence of coronary disease etc.), and to lower fecal pH and to increase fecal bulking (and hence reduce the incidence of colonic cancers etc.). Furthermore, it is part of the common general knowledge in the art (see D1, D2 et al.) that a diet containing an increased proportion of unsaturated fat (compared with saturated fat) contributes toward a reduction in serum cholesterol and triglyceride levels and also toward a positive effect on the glucose/insulin system (hence decreasing the incidence of diabetes). Clearly, therefore, a diet rich in both resistant starch and unsaturated fat (at the expense of saturated fat) would provide numerous nutritive benefits.

**Supplemental Box**

(To be used when the space in any of the preceding boxes is not sufficient)

**Continuation of V**

Composition claims 13-25, 34-38 cannot be considered inventive when compared with the prior art in the light of the common general knowledge because they pertain to compositions comprising both resistant starch and unsaturated fat and which produce results which are no more than the expected aggregate results for each of the individual components. That is, there is no evidence for any synergistic effects between the components. Nor is there any evidence pertaining to any unexpected technical difficulties overcome in combining the components. Hence, documents D1, D3, D4 etc (pertaining to the nutritive benefits of resistant starch) in combination with the common general knowledge (pertaining to the nutritive benefits of unsaturated fat as evidenced by D2, for example) are prejudicial to the inventive step of these claims.

Moreover, method claims 1-12, 26-33 cannot be considered inventive when compared with the prior art in the light of the common general knowledge due to the following. Firstly, as noted above, the skilled artisan would be motivated to combine the benefits of both resistant starch and unsaturated fat in order to arrive at a method for regulating fat and carbohydrate metabolism, reducing the incidence of diabetes, reducing glucose and/or insulin (et al.) in an individual. Secondly, any of the specific effects ascribed to the resistant starch/unsaturated fat nutritive diet but not specifically taught in the prior art (such as reducing plasma leptin concentrations) would, clearly, occur inherently as a result of this method. That is, while some of these effects, such as reducing leptin concentrations, are not reported in the above documents, the use of a resistant starch/unsaturated fat nutritive diet would inherently produce this effect. Therefore, claims 1-12, 26-33 cannot be considered inventive when compared with the teachings of the above documents (D1, D3, D4 etc. which disclose the various beneficial properties of resistant starch) in the light of the common general knowledge (as exemplified by D2 which teaches the beneficial effects of replacing saturated fat with unsaturated fat).

Hence, claims 1-38 cannot be deemed inventive when compared with the above documents in the light of the common general knowledge as the subject matter of the claims would be considered routine to one of ordinary skill in the art.